Precalculus Final Exam

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MATH

Precalculus Final Exam

This exam is comprehensive over the entire course and includes 12 questions. You have 60 minutes to complete the exam.

The exam is worth 100 points. The 8 multiple choice questions are worth 5 points each (40 points total) and the 4 free response questions are worth 15 points each (60 points total).

Mark your multiple choice answers on this cover page. For the free response questions, show your work and make sure to circle your final answer.

1. (5 pts) A B C D E

2. (5 pts) A B C D E

3. (5 pts) A B C D E

4. (5 pts) A B C D E

5. (5 pts) A B C D E

6. (5 pts) A B C D E

7. (5 pts) A B C D E

8. (5 pts) A B C D E

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1. **(5 pts)** Solve the trigonometric equation $\tan\alpha = 1$.

A $\alpha = 30^\circ$

B $\alpha = 45^\circ$

C $\alpha = 60^\circ$

D $\alpha = 90^\circ$

E $\alpha = 0^\circ$

2. **(5 pts)** Convert the polar coordinates $(2,\pi/3)$ into rectangular coordinates.

A $\left(1,\sqrt{3}\right)$

B $\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$

C $\left(\frac{\sqrt{3}}{2},\frac{1}{2}\right)$

D $\left(\sqrt{3},1\right)$

E $\left(\sqrt{2},\sqrt{2}\right)$

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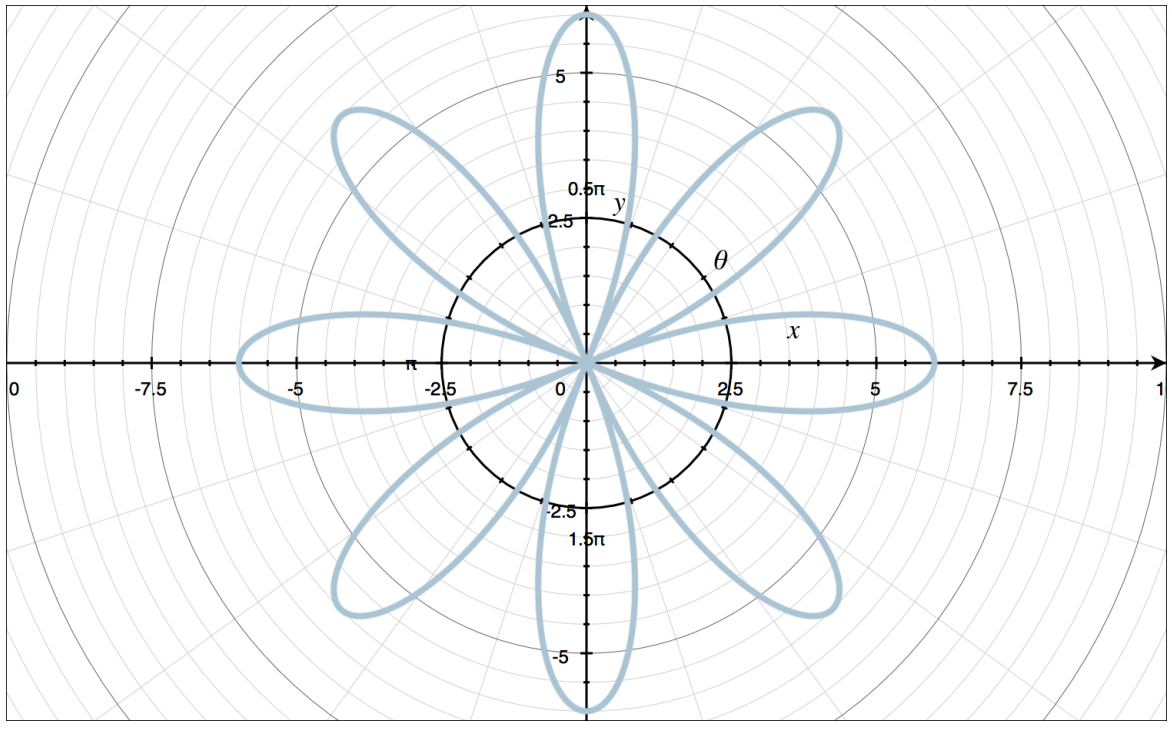
3. **(5 pts)** Convert the polar equation $r = 4\cos\theta$ to the correct rectangular equation.

A	$x^2 + (y-2)^2 = 4$	D	$(x-4)^2 + y^2 = 4$
B	$(x+2)^2 + y^2 = 4$	E	$(x-2)^2 + y^2 = 4$
C	$(x+4) + y^2 = 4$		

4. **(5 pts)** What is the equation of the polar curve pictured?



A	$r = 4\sin 6\theta$	D	$r = 8\cos 6\theta$
B	$r = 6\sin 8\theta$	E	$r = 4\cos 6\theta$
C	$r = 6\cos 4\theta$		

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5. **(5 pts)** What is the focus point of the parabola $y^2 + 4y - x + 1 = 0$?

A $\left(\frac{11}{4}, 2\right)$

C $\left(-\frac{11}{4}, -2\right)$

E $(-3, -2)$

B $\left(-3, -\frac{7}{4}\right)$

D $\left(3, \frac{7}{4}\right)$

6. **(5 pts)** What is the eccentricity of the ellipse $x^2 + 2y^2 - 2x + 12y - 17 = 0$?

A 0.1179

C 0.8235

E 0.7071

B 0.2041

D 0.7059

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7. **(5 pts)** Simplify $5i^2 - 2i^3 + i^4 + 4i$.

A $4 + 2i$

B $4 + 6i$

C $-7 + 2i$

D $4 + 6i$

E $-4 + 2i$

8. **(5 pts)** Multiply.

$$\left[2\sqrt{3}\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)\right]\left[\frac{4}{\sqrt{3}}\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)\right]$$

A $\frac{8\sqrt{3}}{3}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

B $8\left(\cos\frac{13\pi}{12} + i\sin\frac{13\pi}{12}\right)$

C $8\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

D $\frac{8\sqrt{3}}{3}\left(\cos\frac{13\pi}{12} + i\sin\frac{13\pi}{2}\right)$

E $8\left(\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right)$

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9. **(15 pts)** Sketch the graph of the parametric curved that's defined by $x = 2 + 3\sin t$ and $y = 1 - \cos t$, where $-\pi/2 \leq t \leq \pi/2$.

10. **(15 pts)** Find the vertices of the hyperbola defined by the set of parametric equations.

$$x = 7t + \frac{1}{2t}$$

$$y = 7t - \frac{1}{2t}$$

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11. **(15 pts)** Find the value of the expression. Express your answer in the form $a + bi$.

$$\left[2\sqrt{2}\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)\right]^4$$

12. **(15 pts)** Find the four fourth roots of the expression.

$$16\left(\cos\frac{9\pi}{8} + i\sin\frac{9\pi}{8}\right)$$

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